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ABSTRACT

Recent research findings have shown a positive relationship between achievement and the amount of time students engage in learning activities. Since the greatest percentage of class time is allocated to seatwork, with worksheets being the most frequently used activity, a study investigated the effects of using three types of worksheet tasks on engaged learning time (ELT) for fifth grade students of three levels of reading ability (high, middle, low). The 134 subjects were assigned to one of three treatment groups: (1) drill, consisting of worksheets composed of multiple choice, true/false, and fill-in-the-blank questions; (2) comprehension, consisting of worksheets designed to promote comprehension of subordinate lesson concepts by requiring analysis, evaluation, or application of the lesson material; and (3) structuring, consisting of worksheets requiring students to locate and write main ideas appearing in the text. The results indicated that low level readers in the drill treatment spent a significantly greater amount of their time on-task than did high level readers in the same treatment. In addition, high and middle level readers assigned to the structuring treatment had a significantly higher engagement rate than did high level readers in the drill treatment. Finally, subjects at each of the three reading levels in the comprehension treatment spent significantly more time on-task than did high level readers in the drill treatment. (FL)

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INTERACTION EFFECTS OF TASK VARIABLES AND ABILITY ON TASK ENGAGEMENT

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Running Head: Interaction Effects

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Problem

Traditionally, research on teaching and teacher effectiveness has been concerned with variability in teacher behavior. Recently, some researchers have moved from a primary concern with teacher behaviors to consideration of student variables (e.g., Fisher, Filby, Marliave, Cahan, Sishaw, Moore & Berliner, 1978). A particularly salient student variable is that of student attention to given learning tasks or task engagement. Task engagement or engaged learning time (ELT) may be defined as the proportion of the time allocated for task completion that a student appears to actually attend to the task.

Findings from classroom reasearch studies (e.g., Rosenshine & Berliner, 1978) indicate that for students in the primary grades (ages 6 through 10) achievement is positively related to time engaged in learning activities. Research findings have also demonstrated that students are most likely to engage in tasks which afford them moderate to high degrees of task success. However, classroom research has not yet focused on many other specific task variables which may influence student engagement. For example, task variables yielding optimal engagement rates for students of different abilities have not been examined.

Research has shown that, on the average, 50 percent of classroom lesson time is allocated to seatwork activities (e.g., McDonald, 1977),

worksheets being the most frequently used seatwork activity. Worksheets are ideally suited for facilitating the production of specific classroom achievement outcomes because teachers may control both their format and content. Additionally, the content material and processes tapped by worksheet activities are amenable to experimental manipulation. Whereas previous studies have examined the effects of reading ability and task variables (such as student success rate) on ELT independently, this study particularly examined the interaction effects between task variables and students' reading ability on ELT.

Subjects

The experimental sample consisted of the students in five randomly selected fifth-grade classrooms in three elementary schools. Students across classrooms were randomly assigned to treatment groups; therefore, students rather than classrooms were the units of analyses (total n=134).

Procedures

Students across the five classes were ranked on reading ability as measured by the reading subtest of the Comprehensive Test of Basic Skills (CTBS). Ranked subjects were then divided into equal thirds -- high level, middle level, and low level. Within each level, students were then randomly assigned to one of three treatment groups.

The treatment was type of worksheet. The "drill" treatment group was given worksheets consisting of matching, true-false, multiple choice, and fill-in-the-blank questions. These questions were designed to elicit recall or recognition of factual information or details.

The "comprehension" treatment group was given worksheets consisting of questions designed to promote comprehension of superordinate lesson

concepts by requiring analysis, evaluation, or application of the factual lesson material. An example of a comprehension item would be: "Look at the picture on page 265 of your Social Studies Book. What are some ways that the office in the picture is different from most offices today?"

Students in the "structuring" treatment group were given worksheets requiring them to locate and write main ideas appearing in the text. Students in the structuring group were generally directed to "write three important or main ideas" from a given page or passage in the textbook lesson. This instruction was repeated for each page or significant lesson passage.

On each of three days during a designated week students were presented with an experimenter-prepared, teacher-read introduction to the day's lesson. After presentation of this scripted introduction, students were asked to follow along in their social studies textbook while the teacher read the textual material aloud.

Following teacher reading of the lesson, folders were distributed to the students. Treatment group assignment determined the type of worksheet contained in each student's folder. Each student completed the same type of worksheet on each of the three treatment days.

Students were told they could refer to their textbooks to aid in worksheet completion. Teachers were instructed to be available for assistance to pupils upon request, but were also instructed not to initiate any teacher-pupil interaction.

Time allowed for lesson presentation and worksheet completion across all classrooms on each of the treatment days was 50 minutes. This time

allottment proved sufficient for even the slowest workers to complete their worksheets. Students who finished before the 50 minutes had elapsed were instructed to silently read a library book or complete other unfinished class assignments.

Two classroom observers were present on each of the treatment days to code ELT. Engagement was defined as looking at the textbook, looking at the worksheet, or writing on the worksheet. On each day of the experiment observers were instructed to randomly select two students from each treatment group for observation. Treatment group could be easily noted as the students' worksheets were color coded. The observers, as well as the teachers and students, were unaware of the meaning of the color code.

Observers were then asked to note which corner of the selected students' worksheets had been clipped. Different clipped edges represented different reading levels. Again, the observers, teachers, and students were unaware of the meaning of the code. Each observer then charted the behavior of the selected students by establishing a sequence of observation whereby one of the six selected children was observed every ten seconds and each of the six children was observed once per minute.

The two observers assigned to each treatment session worked independently. Hence, 12 children were observed per classroom per lesson resulting in approximately 180 total observations (12 children x five classrooms x three lessons).

The observers had been trained in observation procedures by the experimenter. Prior to the treatment days these procedures were practiced by the observers in the experimental classrooms, thereby reducing possible

novelty effects of their presence during the experiment. Interrater agreement among the seven observers was .88.

On the Monday directly following the week of the experiment, an experimenter-developed achievement test over the instructional material covered the previous week was administered. This achievement measure consisted of 20 items calling for recognition or recall of factual information and 20 items requiring the student to demonstrate comprehension of superordinate lesson concepts. Test items were randomly ordered, i.e., they were not grouped by categories.

Results

The data for ELT were analyzed using a 3 (treatments) x 3 (reading levels) analysis of variance. Data were randomly deleted to create equal cell n's.

Significant main effects were not demonstrated for treatment or levels. However, a significant effect was found for the treatment x levels interaction ($F=3.53$; $df=4, 72$; $p < .05$). Using Tukey's HSD test for pairwise comparisons, post hoc analysis of this significant interaction indicated that:

1. Low level readers in the drill treatment group spent a significantly greater percentage of time on-task than did high level readers in the same treatment group ($p < .01$).
2. High and middle level readers assigned to the structuring treatment had a significantly higher engagement rate than high level readers in the drill treatment group ($p < .05$).
3. Subjects at each of the three reading levels in the comprehension group spent significantly more time on-task than high level readers in

the drill treatment group (high readers and low readers, $p < .05$; middle readers, $p < .01$).

The achievement test data were analyzed using a 3 (treatments) x 3 (levels) x 2 (trials or subtests) repeated measures analysis of variance for equal n's. Data were randomly deleted to obtain equal n's per cell. Of particular relevance to this study of ELT was the significant main effect for levels ($F=21.08$; $df=2, 81$; $p < .001$). Post hoc pairwise comparisons, using Tukey's HSD test, revealed that high and middle level readers performed significantly better than low level readers across all trials and treatments ($p < .01$). No significant main effect for treatment was demonstrated. Neither were there any significant interaction effects.

Conclusions

Following treatment, high and middle level readers outperformed low level readers on measures of recall/recognition and comprehension. These results were expected and support previous reasearch findings.

The findings for ELT were more surprising than the findings for achievement. Various researchers have demonstrated that task engagement is positively related to achievement. Hence, in this experiment, the significant main effect for reading level on the achievement measure might have suggested that high and middle level readers would outperform low level readers on the ELT measure. However, there was no significant main effect for level on the ELT variable.

Recent research findings have also shown that on-task behavior is often highest for activities, such as drill-type worksheets, in which students experience a relatively high degree of task success. Thus, it

could be expected that ELT rates would have been greatest for the drill group in the present study. Yet, there was no significant main effect for treatment on the ELT variable.

The significant interaction between treatment and reading levels on the ELT measure, however, does provide valuable clues regarding the relationship among task variables, task engagement, and ability levels. Although low level readers spent more time than high level readers on drill activities, it does not seem reasonable to expect that low ability readers will outperform high ability readers on measures of achievement. Rather, this finding suggests that the drill task may have been appropriate for low level readers but may not have been of optimal difficulty or interest for high level readers.

Examination of the raw data reveals that low level readers in the drill treatment group did outperform low level readers in the comprehension and structuring groups on test items requiring recall or recognition of factual information. High and middle level readers in the drill group did not outperform high and middle level readers, respectively, in the comprehension and structuring groups.

The finding that high and middle level readers in the structuring group were on-task a greater percentage of time than high level readers in the drill group may be attributed, in part, to the fact that the structuring task required more writing. Again, appropriateness of task difficulty or interest level may have been factors. That is, the structuring task may have been appropriately difficult or interesting for high and middle level readers.

The finding that all readers in the comprehension group attended to the task for a greater percentage of time than high level readers in the drill group might appear to indicate that the comprehension groups would outperform the high level readers in the drill group on measures of achievement. Examination of the raw data reveals that high level readers in the comprehension group did outperform high level readers in the drill group on the recall/recognition subscale.

It appears that student ability levels and specific task variables, particularly task difficulty and its influence on success rate, cannot be ignored in future investigations of ELT. It is likely that ELT is task and ability specific. However, it is also probable that useful generalizations may be drawn and confirmed through research designed to examine the relationships between task specific ELT and various types of achievement for students of varying ability.

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